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BOLETI FROM WESTERN NORTH CAROLINA

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It was my privilege to spend two weeks during the past summer with Dr. C. A. Schenck, Forester of the Biltmore Estate, in Pisgah Forest, Transylvania Co., North Carolina, about fifty miles southwest of Asheville. Dr. Schenck's summer home is in Pink Bed Valley, 3,200 ft. above sea level, with surrounding ridges reaching a maximum elevation of 4,500 ft. The forest there is mostly composed of hardwood species, chestnut, oak, and tulip predominating, while pitch pine is found sparingly on the dry ridges and hemlock and white pine along the streams. Maple, birch, hickory, basswood, sourwood, black gum, black locust, butternut, ash, and Fraser's magnolia also occur as minor hardwood species. *Rhododendron*, *Kalmia*, and *Azalea* are exceedingly abundant, in many places forming impenetrable thickets which, when in flower, are visible from a distance as pink-colored masses or "beds."

About the middle of July, when I arrived at Pink Bed Valley, frequent showers had developed quantities of fleshy fungi, among them many boleti, which were collected and critically studied in the fresh condition, and afterwards dried by artificial heat. Dr. H. D. House very kindly assisted me in collecting, and the fact that several interesting species are represented by more than one or two specimens in this collection is largely due to his perseverance.

The following list includes practically all the species of Boletaceae collected during my stay in Pink Bed Valley arranged in alphabetical order under the generic and specific names commonly recognized in this country.

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Boletinus pictus Peck.

Collected twice in considerable quantity, once in swampy ground and once on a dead locust log in low woods.

This species has the large radiating tubes of the genus *Boletinus*, and is easily distinguished among the Boletaceae by the conspicuous red scales that adorn its pileus and stem. It is fairly common in the woods and mossy swamps of the mountainous regions of the eastern United States. Edible.

Boletus americanus Peck.

Common, especially near pines.

This is a common and widely distributed edible species having a yellow, viscid cap usually dotted or streaked with red and a slender yellow stem covered with reddish-brown viscid dots which become black on drying.

Boletus auriflammeus B. & C.

Five specimens were collected on a well-drained bank exposed to the sun about two hours just after midday. Dr. House afterwards sent me a number of fine specimens.

This species is of great interest, being very rare and very beautiful. It was originally collected in North Carolina by Rev. M. A. Curtis and sent by him to Berkeley, who described it. Peck found one plant at Sandlake, New York, and it was also reported by Beardslee from Brookside, West Virginia. The description given by Berkeley is both incomplete and inaccurate, but the bright golden-yellow color of the pileus and stem should easily distinguish it. The mouths of a few of the tubes sometimes appear scarlet, especially on drying, but this character is not at all conspicuous. The stem is beautifully reticulated.

Boletus auriporus Peck.

Occasional on banks and in open woods.

This species may be easily recognized by its bright golden-yellow tubes which retain their color on drying. The cap is usually reddish-brown and the stem is viscid if the weather is not too dry. Edible.

Boletus bicolor Peck.

Several times collected on banks and in thin woods.

A beautiful species, with smooth purplish-red cap, bright yellow tubes, and smooth, red, or yellow stem. When broken both flesh and tubes change to blue. This plant has been reported from only a few localities. Beardslee reported it very common in the mountains of West Virginia. Edible.

Boletus castaneus Bull.

Rare in sandy soil in open woods.

This species has a hollow stem and dries easily. The cap is reddish-brown, the flesh white and unchangeable, and the free tubes are at first white then yellowish. It is widely distributed and usually common. Edible.

Boletus chromapes Frost.

Very abundant in open woods throughout the valley and on the adjoining slopes.

A very attractive species, and one easily recognized by its stem, which is bright yellow near the base and finely scabrous over its entire surface. The cap is pale-red and the tubes and most of the stem white. Edible.

Boletus chrysenteron Fries.

Found a few times on roadside banks.

This species is widely distributed and usually common. The cap and stem are usually red and the tubes yellow and large. It dries easily, being spongy-tomentose in texture. The surface of the cap is soft, finely floccose, and often cracked. Edible.

Boletus cyanescens Bull.

Rather common in open woods, at times solitary, but usually gregarious.

A common and widely distributed plant easily known by the deep-blue color which its flesh and tubes assume when wounded. The cap is pale-tan and floccose-tomentose, the tubes and hollow stem white or pallid. It dries very readily.

Boletus eximius Peck.

Several times collected in thin woods and along roadsides.

The stem of this species is very characteristic, being lilac-gray and furfuraceous, while the cap and tubes are chocolate-brown. This species has been rarely reported, but I have it from New

England, New York, and Virginia, as well as from North Carolina.

BOLETUS FELLEUS Bull.

Collected only once or twice, but probably common later.

This abundant and widely distributed plant is easily known by the bitter taste of its flesh. The tubes are flesh-colored and the cap usually some shade of brown. When fully grown, it is sometimes over a foot in diameter. Said to be poisonous.

BOLETUS FUMOSIPES Peck.

Rather common on shaded roadside banks.

This species has been almost unknown except to Professor Peck, who described it in 1898 from material collected at Port Jefferson, Long Island. Professor Atkinson found it in abundance in North Carolina, and I collected it also in Virginia. It is peculiar in having a pale bluish-green band at the top of the stipe. The cap is also very reticulate-rimose, and the tubes an unusual grayish-white, afterwards discolored by the deep ochraceous-brown spores. When once seen, it is difficult to confuse it with any other species.

BOLETUS GRACILIS Peck.

Collected three or four times, but only one plant was found on each occasion.

This species is not generally well known, although said to be abundant in some localities. It belongs to a small group having flesh-colored spores, which tinge the white tubes at maturity. *B. felleus*, *B. indecisus*, and *B. nigrellus* are large plants with thick stems, from which *B. gracilis* is easily distinguished by its slender habit and small size.

BOLETUS GRANULATUS L.

Common, preferring open places in woods, and found more abundantly near pines.

This species is quite common in the eastern United States, usually appearing in scattered groups near pine trees. The cap is very slimy and brownish when moist, changing to yellow on partial drying; the tubes and stem are yellowish, with viscid dots which become black on drying. It is rather easy to confuse this species with *B. americanus*. Edible.

Boletus griseus Frost.

Quite common in open places in woods.

This species is very similar to *B. retipes*, but is easily distinguished in the field by its pure white tubes, those of *B. retipes* being decidedly yellow. The cap is gray and the stem usually whitish. Edible.

Boletus indecisus Peck.

One of the most common species, occurring in clusters and colonies especially in clayey soil along the edges of exposed roads and trails.

This species is closely related to *B. felleus*, from which it is distinguished by its mild taste, that of *B. felleus* being decidedly bitter.

Boletus luridus Fries.

Collected in abundance, especially on clay banks along roads.

This species, said to be very poisonous, may be at once distinguished from the other species mentioned here by the reddish-orange mouths of its tubes, the interior of the tubes being yellow. When cut, the entire cut surface of cap, tubes, and stem changes at once to blue. All boleti with red or reddish tube-mouths should be avoided when collecting mushrooms for food.

Boletus luteus L.

Collected three times in open sandy soil in woods.

Cap very viscid, yellowish-brown ; tubes and stem yellow, the latter dotted and also provided with a large white annulus. This is a well-known and widely distributed edible species commonly found in coniferous woods.

Boletus miniato-olivaceus Frost.

Rather common in open woods near roads and trails.

Cap vermilion, tubes bright yellow, stem yellow with pink markings. This species is easily distinguished among the red boleti by its quick change to blue at any point, either outside or inside, where bruised or even touched with the fingers. It is reported from New England south to West Virginia, and is said to be poisonous.

Boletus Morgani Peck.

A single fine specimen was collected by Dr. Schenck on one of the mountain trails. After my departure Dr. House found several specimens, which he sent to the Garden Herbarium. Dr. Harper also collected it recently in Georgia.

This is a rare species, described from Kentucky and found in Virginia and one or two other states. Cap viscid, smooth, perfectly glabrous, shining testaceous; tubes flavous, becoming greenish from the spores; stem very long and rough with deep reticulations, flavous above, purplish-stained below. The long rough stem should distinguish it from all other boleti except *B. Russellii*, which differs in having a dry, tomentose cap.

Boletus Peckii Frost.

One of the most common species, usually along the roads in rather open woods.

Easily recognized by its red cap with a bloom like that of a peach. The tubes and upper part of the stem are yellow, the remainder of the stem red, and the whole surface reticulated. The stem of *B. speciosus* is entirely yellow and that of *B. bicolor* is not reticulated. Reported edible.

Boletus Ravenelii B. & C.

About ten plants were collected in all, some of them very fine. Dr. House later found many more. This was one of the few species that preferred the deep shade of the mountain laurel.

Cap dull reddish, both it and the stem covered with a light yellow powder, by which the plant is readily distinguished. The conspicuous veil was found more than once covered with a print of the olive-green spores. As the stem elongates, part of the veil remains attached to the margin of the cap and part forms a clinging cortina on the stem. I tasted the flesh and found it sweet. This beautiful species has been several times reported in the eastern United States, but it is not abundant.

Boletus retipes B. & C.

A common species in thin woods.

This species was first described from plants collected by Curtis in North Carolina. It has since been found quite commonly in

the eastern United States, and as far west as Wisconsin. The cap varies from yellow to brown, the flesh and tubes are yellow, and the yellow stem is beautifully reticulated to the base.

BOLETUS SCABER Fries.

Common in various habitats.

This is one of the best known and most abundant of all the species of boleti. The scabrous stem and the unchanging white flesh and tubes should distinguish it, in spite of the variable colors of the cap. Edible.

BOLETUS SPECIOSUS Frost.

Not rare in openings in woods.

This beautiful species is easily known by its apple-red cap without a bloom and its brilliant yellow tubes and stem, the latter reticulated. *B. bicolor* and *B. Peckii* are related species.

BOLETUS SEPARANS Peck.

A very abundant and very handsome species, found usually in open woods near the roads and trails. Also found in abundance at Falls Church, Virginia, during the latter part of July.

Cap and stem brownish lilac, the latter reticulated; flesh and tubes white; spores yellowish-brown.

BOLETUS SUBTOMENTOSUS L.

Quite common along roads and trails.

This widespread plant has been reported from many parts of America. It is one of the boleti that may be dried in the sun, being of a spongy rather than a fleshy texture. The cap is usually yellowish-brown or olive-tinted, with a distinct tomentum, and the large tubes and stem are yellow. *B. chrysenteron*, a closely related species, usually has more red both in cap and stem. Edible.

Boletus Vanderbiltianus sp. nov.

Pileus subconical, 2–3 cm. broad, 1–2 cm. thick; surface smooth, dry, conspicuously ornamented on the umbo with dense, pointed, imbricated, dark purple scales, which become gradually smaller and give place to minute purplish specks near the margin, the color changing from atropurpureous to latericeous; margin thin, undulate, concolorous, with a distinct inflexed sterile portion 1 mm. broad: context thick, fleshy, firm, cream-colored, unchange-

able, sweet to the taste; tubes adnate, slightly decurrent on one side, salmon-colored near the margin, incarnate next to the stipe, unchangeable within, the mouths becoming incarnate as the spores mature, mouths angular, 1 mm. or less broad, elongated to 2 mm. near the stipe, edges thin, entire: spores oblong-ellipsoid, smooth, pale ochraceous-brown, 9–12 × 2–3 μ: stipe curved, cylindrical, slightly enlarged above, delicately pruinose, not reticulated, deep salmon-colored, changing to incarnate, finely purplish-dotted like the margin of the cap, solid and cream-colored within, 2–3 × 0.5 cm.

A solitary specimen of this very beautiful little species was first found by the writer on the roadside in thin oak woods. Dr. House later collected several specimens of it and sent them to me. He reports it a slower grower, requiring three to five days to develop from the button stage, and its maximum height is rarely more than four centimeters.

FISTULINA HEPATICA Fr.

Common on chestnut stumps.

This well-known and widely distributed edible species is easily recognized by its resemblance to a piece of beefsteak. It is found almost exclusively, in this country, on chestnut and oak stumps.

FISTULINA PALLIDA Berk. & Rav.

Found only once on the base of a small decayed chestnut tree by the roadside.

This species probably occurs throughout most of the eastern United States, but it has been rarely collected. The cap is paler in color than that of *F. hepatica* and the stem is longer and more branched. These characters, with the white flesh, should easily distinguish it.

STROBILOMYCES STROBILACEUS (Scop.) Berk.

Abundant on shaded banks along roads and trails.

This species is blackish and shaggy, with white flesh, which on being cut or broken changes to reddish and finally to black. It is abundant everywhere in the woods, and is often collected for food.

KEY TO THE ABOVE SPECIES*

* See key to groups in TORREYA for March, 1908.

A. Cap red, without and within, stem very short. *Fistulina hepatica*

Cap fawn-colored without, white within, stem much longer and branched. *Fistulina pallida*

B. Tubes large, arranged in radiating rows; pileus and stem adorned with conspicuous red scales. *Boletinus pictus*

C. Pileus blackish and shaggy; flesh white, changing to reddish when bruised. *Strobilomyces strobilaceus*

E. Stem annulate and glandular-dotted. *Boletus luteus*

F. Pileus yellow, often streaked with bright red; stem slender, 8 mm. or less in diameter. *Boletus americanus*

Pileus brown when moist, yellowish on drying; stem stouter, over 8 mm. in diameter. *Boletus granulatus*

G. Stem shaggy and lacerate, with deep reticulated furrows; cap viscid and glabrous. *Boletus Morgani*

H. Flesh and tubes becoming deep blue when wounded. *Boletus cyanescens*

Flesh and tubes white or yellowish, unchanging when wounded. *Boletus castaneus*

I. Stem and pileus covered with a conspicuous yellow powder. *Boletus Ravenelii*

J. Pileus large, stem 1 cm. or more thick.

Flesh decidedly bitter. *Boletus felleus*

Flesh not bitter. *Boletus indecisus*

Pileus small, stem about 5 mm. thick. *Boletus gracilis*

K. Tubes yellow within, mouths reddish-orange. *Boletus luridus*

L. Stem entirely white or grayish-white. *Boletus scaber*

Stem conspicuously bright yellow near the base. *Boletus chromapes*

M. Pileus gray, tubes white. *Boletus griseus*

Pileus yellow or brown, tubes yellow. *Boletus retipes*

Pileus red.

Stem bright lemon-yellow throughout. *Boletus speciosus*

Stem red below, yellow above. *Boletus Peckii*

N. Tubes white, afterwards colored by the ochraceous brown spores. *Boletus fumosipes*

Tubes salmon colored, spores yellowish-brown. *Boletus Vanderbiltianus*

Tubes yellow or greenish-yellow.

Tubes changing to blue when wounded.

Pileus subtomentose. *Boletus chrysenteron*

Pileus glabrous.

Pileus bright red to olivaceous, the entire plant quickly turning blue at any point where touched. *Boletus miniato-olivaceus*

Pileus dark red, not sensitive, changing color slowly or not at all when bruised. *Boletus bicolor*

Tubes not changing to blue when wounded.

Pileus subtomentose, tubes becoming greenish-yellow. *Boletus subtomentosus*

Pileus glabrous, tubes remaining a beautiful golden-yellow even after long drying. *Boletus auriporus*

O. Stem and pileus bright golden-yellow; plant small. *Boletus auriflammeus*

Stem brownish-lilac or chocolate-brown.

Stem reticulated. *Boletus separans*

Stem furfuraceous, not reticulated. *Boletus eximius*